ICT PHD

Research project for a PhD curriculum in ICT – Computer Engineering and Science

**Tutor**: Costantino Grana

**Proposed Title of the research**: Deep learning techniques for skin lesion analysis and automated diagnosis systems

**Keywords:**

deep learning

melanoma

skin lesion

computer-aided diagnosis

**Research objectives: (max 10 rows)**

Melanoma is a type of skin cancer and it is characterized from the experts as the most aggressive. An early diagnosis and a surgery removal can give to the patient almost 99% survival rate. Several Computer-Aided Diagnosis (CAD) systems have been proposed to assist dermatologists in an early diagnosis. The aim of the research is dealing with the processing of color images that depict images of patients with possible melanoma. The main point is to build a system to identify cases that could be potentially dangerous. Deep convolutional neural networks show potential for general and highly variable tasks across many fine-grained object categories. The research will study and develop techniques for skin lesion analysis and automated diagnosis systems, which leverage deep network algorithms.

**Proposed research activity: (max 10 rows)**

* Study of latest literature publications
* Study of the main deep learning frameworks (with specific attention to PyTorch)
* Reimplementation of state of the art techniques for both study and verification
* Application of novel strategies to the problem
* Participation in international image analysis competitions on the topic

**Supporting research projects (and Department)**

None

**Possible connections with research groups, companies, universities.**

Pattern Recognition and Human Language Technologies Research Center, Universitat Politècnica de València, Spain

 (\*) optional

(\*\*) optional/to be completed on the second year